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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/691,049	10/23/2003	William J. Brinkley III	7377-P	6094

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EXAMINER	
HANDAL, KAITY V	
ART UNIT	PAPER NUMBER
1764	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/691,049	BRINKLEY, WILLIAM J.	
	Examiner	Art Unit	
	Kaity Handal	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *25 June 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-23* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Von Sturm et al. (USP 3,574,560), in view of Molter et al. (USP 4,818,637), in view of Gallagher (USP 3,895,102), and in view of Richman (US 3,669,751).

With respect to claim 21, Von Sturm et al. discloses a method for generating hydrogen gas comprising the steps of:

- providing a reservoir (1) of hydroxide solution (2);
- providing a gas generating tank (8) in fluid flow communication with said reservoir (1) with a gas inlet (5) defined in its top;
- equipping said generating tank with a plurality of tubular, metallic fuel rods (C2/L25-30);
- pressurizing the reservoir (C2/L17-43);
- transferring hydroxide solution into the gas generating tank from said holding tank in response to pressure to start a gas generating reaction in said generating tank (C2/L17-43);
- selectively pressurizing said generating tank to return hydroxide solution within the

gas generating tank back into said reservoir to stop said reaction (C2/L17-43);

- delivering hydrogen gas to an application (C1/L15-30);

- during said reaction collecting waste/sediment) at the bottom of said generating tank (fig. 2, 15) (as illustrated where sediments are collected in sediment separator (19)) (col. 3, lines 11-17).

While Von Sturm et al. discloses that produced hydrogen gas is used in fuel cell (C1/L15-30), the reference does not explicitly disclose humidifying said hydrogen gas from said generating tank before feeding it to said fuel cell by passing it through a separate water tank.

Molter et al. teaches an improved method for operating a conventional solid polymer electrolyte membrane hydrogen/halogen fuel cell. The improvement comprises humidifying the hydrogen gas by passing it through a separate water tank (as illustrated in Figure 2) prior to it entering the anode chamber thereby providing additional water to be protonically pumped through the membrane to the cathode where it dilutes the acid produced by the cathodic reaction (abstract).

It would have been obvious to one having ordinary skill in the art at the time of the invention to humidify said hydrogen gas from said generating tank of Von Sturm et al. by passing it through a separate water tank before feeding it to said fuel cell, as taught by Molter et al., for the purpose of improving operation of the fuel cell.

Von Sturm et al. does not explicitly disclose heating of the hydroxide solution within said reservoir to a specific temperature, Von Sturm et al. teaches that an increase in temperature produces a stronger development of gas (C2/L46-47). In view of said

disclosure, the specific temperature of potassium hydroxide is not considered to confer patentability to the claims. As the speed and completeness of the chemical reaction are variables that can be modified, among others, by adjusting said temperature of potassium hydroxide, the precise temperature of potassium hydroxide would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed temperature of potassium hydroxide cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the temperature of potassium hydroxide in the method of Von Sturm et al. to obtain the desired speed and completeness of the chemical reaction (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223). An ordinary artisan would be further motivated to increase the temperature of the hydroxide solution to approximately 180°F (80-85°C), because said reaction temperature has been shown to work in generation of hydrogen from reaction of aluminum and hydroxide solution by Gallagher (C10/L19-30).

Von Strum fails to teach in his method to periodically open said generating tank to replace said fuel tubes. Richman teaches a fuel cell hydrogen generator wherein said hydrogen generator is comprised of fuel tubes (fig. 1, 22) such that said generating tank is periodically opened to replace said fuel tubes (22) in order to recharge the battery and replace the spent fuel tubes (22) (col. 3, lines 6-11).

It would have been obvious to one having ordinary skill in the art at the time of the invention to periodically open said generating tank to replace said fuel tubes in the Von Strum's apparatus; as taught by Richman, in order to recharge the battery and replace the spent fuel tubes.

With respect to claim 22, Von Sturm et al. discloses a method for generating hydrogen gas comprising the steps of:

- providing a reservoir (1) of hydroxide solution (2);
- providing a gas generating tank (8) in fluid flow communication with said reservoir (1) with a gas inlet (5) defined in its top;
- equipping said generating tank with a plurality of tubular, metallic fuel rods (C2/L25-30);
- pressurizing the reservoir (C2/L17-43);
- transferring hydroxide solution into the gas generating tank from said holding tank in response to pressure to start a gas generating reaction in said generating tank (C2/L17-43);
- selectively pressurizing said generating tank to return hydroxide solution within the gas generating tank back into said reservoir to stop said reaction (C2/L17-43);
- delivering hydrogen gas to an application (C1/L15-30);
- during said reaction collecting waste/sediment) at the bottom of said generating tank (fig. 2, 15) (as illustrated where sediments are collected in sediment separator (19)) (col. 3, lines 11-17).

While Von Sturm et al. discloses that produced hydrogen gas is used in fuel cell (C1/L15-30), the reference does not explicitly disclose humidifying said hydrogen gas from said generating tank before feeding it to said fuel cell by passing it through a separate water tank.

Molter et al. teaches an improved method for operating a conventional solid polymer electrolyte membrane hydrogen/halogen fuel cell. The improvement comprises humidifying the hydrogen gas by passing it through a separate water tank (as illustrated in Figure 2) prior to it entering the anode chamber thereby providing additional water to be protonically pumped through the membrane to the cathode where it dilutes the acid produced by the cathodic reaction (abstract).

It would have been obvious to one having ordinary skill in the art at the time of the invention to humidify said hydrogen gas from said generating tank of Von Sturm et al. by passing it through a separate water tank before feeding it to said fuel cell, as taught by Molter et al., for the purpose of improving operation of the fuel cell.

Von Sturm et al. does not explicitly disclose heating of the hydroxide solution within said reservoir to a specific temperature, Von Sturm et al. teaches that an increase in temperature produces a stronger development of gas (C2/L46-47). In view of said disclosure, the specific temperature of potassium hydroxide is not considered to confer patentability to the claims. As the speed and completeness of the chemical reaction are variables that can be modified, among others, by adjusting said temperature of potassium hydroxide, the precise temperature of potassium hydroxide would have been considered a result effective variable by one having ordinary skill in the art at the time

the invention was made. As such, without showing unexpected results, the claimed temperature of potassium hydroxide cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the temperature of potassium hydroxide in the method of Von Sturm et al. to obtain the desired speed and completeness of the chemical reaction (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223). An ordinary artisan would be further motivated to increase the temperature of the hydroxide solution to approximately 180°F (80-85°C), because said reaction temperature has been shown to work in generation of hydrogen from reaction of aluminum and hydroxide solution by Gallagher (C10/L19-30).

Von Strum fails to teach in his method to periodically open said generating tank to replace said fuel tubes. Richman teaches a fuel cell hydrogen generator wherein said hydrogen generator is comprised of fuel tubes (fig. 1, 22) such that said generating tank is periodically opened to replace said fuel tubes (22) in order to recharge the battery and replace the spent fuel tubes (22) (col. 3, lines 6-11).

It would have been obvious to one having ordinary skill in the art at the time of the invention to periodically open said generating tank to replace said fuel tubes in the Von Strum's apparatus, as taught by Richman, in order to recharge the battery and replace the spent fuel tubes.

Von Sturm et al. discloses the method wherein:

- the hydroxide solution providing step uses potassium hydroxide (C2/L17-22), but the reference does not explicitly disclose specific concentration of potassium hydroxide. Richman teaches a fuel cell hydrogen generator wherein the aqueous solution of KOH preferably has a concentration of about 30-35% (col. 8, lines 42-47). Furthermore, the specific concentration of potassium hydroxide is not considered to confer patentability to the claims. As the amount of produced hydrogen and speed and completeness of the chemical reaction are variables that can be modified, among others, by adjusting said concentration of potassium hydroxide, the precise concentration of potassium hydroxide would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed concentration of potassium hydroxide cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the concentration of potassium hydroxide in the method of Von Sturm et al. to obtain the desired amount of produced hydrogen and speed and completeness of the chemical reaction (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

3. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Von Sturm et al. (USP 3,574,560), in view of Molter et al. (USP 4,818,637), in view of

Gallagher (USP 3,895,102), and in view of Richman (US 3,669,751) in view of Knowlton et al. (US 2001/0013321 A1).

With respect to claim 23, Von Sturm et al. discloses a method for generating hydrogen gas comprising the steps of:

- providing a reservoir (1) of hydroxide solution (2);
- providing a gas generating tank (8) in fluid flow communication with said reservoir (1) with a gas inlet (5) defined in its top;
- equipping said generating tank with a plurality of tubular, metallic fuel rods/aluminum (C2/L17-30).
- pressurizing the reservoir (C2/L17-43);
- transferring hydroxide solution into the gas generating tank from said holding tank in response to pressure to start a gas generating reaction in said generating tank (C2/L17-43);
- selectively pressurizing said generating tank to return hydroxide solution within the gas generating tank back into said reservoir to stop said reaction (C2/L17-43);
- delivering hydrogen gas to an application (C1/L15-30) such as an engine for powering it;
- during said reaction collecting waste/sediment) at the bottom of said generating tank (fig. 2, 15) (as illustrated where sediments are collected in sediment separator (19)) (col. 3, lines 11-17).

While Von Sturm et al. discloses that produced hydrogen gas is used in fuel cell (C1/L15-30), the reference does not explicitly disclose humidifying said hydrogen gas

from said generating tank before feeding it to said fuel cell by passing it through a separate water tank.

Molter et al. teaches an improved method for operating a conventional solid polymer electrolyte membrane hydrogen/halogen fuel cell. The improvement comprises humidifying the hydrogen gas by passing it through a separate water tank (as illustrated in Figure 2) prior to it entering the anode chamber thereby providing additional water to be protonically pumped through the membrane to the cathode where it dilutes the acid produced by the cathodic reaction (abstract).

It would have been obvious to one having ordinary skill in the art at the time of the invention to humidify said hydrogen gas from said generating tank of Von Sturm et al. by passing it through a separate water tank before feeding it to said fuel cell, as taught by Molter et al., for the purpose of improving operation of the fuel cell.

Von Sturm et al. does not explicitly disclose heating of the hydroxide solution within said reservoir to a specific temperature, Von Sturm et al. teaches that an increase in temperature produces a stronger development of gas (C2/L46-47). In view of said disclosure, the specific temperature of potassium hydroxide is not considered to confer patentability to the claims. As the speed and completeness of the chemical reaction are variables that can be modified, among others, by adjusting said temperature of potassium hydroxide, the precise temperature of potassium hydroxide would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed temperature of potassium hydroxide cannot be considered critical. Accordingly, one of

ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the temperature of potassium hydroxide in the method of Von Sturm et al. to obtain the desired speed and completeness of the chemical reaction (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223). An ordinary artisan would be further motivated to increase the temperature of the hydroxide solution to approximately 180°F (80-85°C), because said reaction temperature has been shown to work in generation of hydrogen from reaction of aluminum and hydroxide solution by Gallagher (C10/L19-30).

Von Strum fails to teach in his method to periodically open said generating tank to replace said fuel tubes. Richman teaches a fuel cell hydrogen generator wherein said hydrogen generator is comprised of fuel tubes (fig. 1, 22) such that said generating tank is periodically opened to replace said fuel tubes (22) in order to recharge the battery and replace the spent fuel tubes (22) (col. 3, lines 6-11).

It would have been obvious to one having ordinary skill in the art at the time of the invention to periodically open said generating tank to replace said fuel tubes in the Von Strum's apparatus, as taught by Richman, in order to recharge the battery and replace the spent fuel tubes.

Von Sturm et al. discloses the method wherein:

- the hydroxide solution providing step uses potassium hydroxide (C2/L17-22), but the reference does not explicitly disclose specific concentration of potassium hydroxide.

Richman teaches a fuel cell hydrogen generator wherein the aqueous solution of KOH preferably has a concentration of about 30-35% (col. 8, lines 42-47). Furthermore, the specific concentration of potassium hydroxide is not considered to confer patentability to the claims. As the amount of produced hydrogen and speed and completeness of the chemical reaction are variables that can be modified, among others, by adjusting said concentration of potassium hydroxide, the precise concentration of potassium hydroxide would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed concentration of potassium hydroxide cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, the concentration of potassium hydroxide in the method of Von Sturm et al. to obtain the desired amount of produced hydrogen and speed and completeness of the chemical reaction (*In re Boesch*, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (*In re Aller*, 105 USPQ 223).

Von Strom fails to teach details downstream of delivering hydrogen to an application such as an engine, collecting the engine exhaust and condensing water from the exhaust and returning water from said collecting and condensing step to said reservoir. Knowlton teaches supplying fuel for a vehicle which includes delivering hydrogen to an engine (fig. 1, 2) (page 2, paragraph [0023], lines 1-4), collecting the engine exhaust and condensing water from the exhaust in water recovery device (5);

and returning water from said collecting and condensing step to said reservoir (4) (as illustrated) in order to convert the water vapor in the exhaust back into water reclaiming 80% of the water supplied to the fuel conversion device for reuse in the process (page 3, paragraph [0026]).

It would have been obvious to one having ordinary skill in the art at the time of the invention to deliver hydrogen to an application such as an engine, collect the engine exhaust and condense water from the exhaust and return water from said collecting and condensing step to said water reservoir in the apparatus of Von Strom, as taught by Knowlton, in order to convert the water vapor in the exhaust back into water reclaiming 80% of the water supplied to the fuel conversion device for reuse in the process for reuse.

Response to Arguments

Specification

Objection made to the specification is withdrawn by examiner due to applicant's amendment.

Drawings

Objection made to the drawings is withdrawn by examiner due to applicant's amendment made to the specification.

Prior Art Rejection

Applicant's arguments with respect to claims 15-20 have been considered but are moot in view of the new ground(s) of rejection necessitated by the amendment made to the claims. Applicant canceled claims and added new claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kaity Handal whose telephone number is (571) 272-8520. The examiner can normally be reached on M-F 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on (571) 272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KH

9/5/2007

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